

WHAT IS CLAIMED IS:

1. A multicast authentication method for connecting a plurality of receiver hosts and a network of a sender host through a network interconnection apparatus and authenticating participate of the sender host in one multicast group by an authentication server in the network, the method comprising:

a registration step of registering an address of each of the receiver hosts in the authentication server in accordance with an application for the participation in the one multicast group of the sender host from each of the receiver hosts; and

an authentication step of authenticating each of the receiver hosts based on a registration content of the authentication server in response to a participation request message from the receiver host.

2. The multicast authentication method according to claim 1, further comprising an acceptance step of accepting each of the receiver hosts to participate in the one multicast group of the receiver host if the receiver host is authenticated in response to the participation request message.

3. The multicast authentication method according to claim 2, wherein

in the acceptance step, when a multicast user registration is made in the registration step and it is determined in the authentication step that authentication fails, an entry of the multicast user registration is deleted in the

acceptance step.

4. The multicast authentication method according to claim 1, wherein

5 in the registration step, information on a port of said network interconnection apparatus to which the each receiver host or the relay unit is connected is registered together with the address of the receiver host or the relay unit in the authentication server.

10 5. The multicast authentication method according to claim 1, wherein

in the registration step, a group address of the multicast group is further registered in the authentication server; and

15 in the authentication step, the each receiver host or the relay unit and the one multicast group are authenticated based on the registration content of the authentication server in response to the participation request message from the each receiver host.

20 6. The multicast authentication method according to claim 5, wherein

in the registration step, a pair of the address of the each receiver host or the relay unit and the group address
25 of the one multicast group are registered as one user name; and

in the authentication step, a transmitting end address

and the group address included in the participation request message are extracted, and the registration content of the authentication server is retrieved and the each receiver host or the relay unit is authenticated while setting a pair of the transmitting end address and the group address as one user name.

7. The multicast authentication method according to claim 1, wherein

10 in the registration step, the address of the each receiver host or the relay unit is registered in the authentication server in response to an application for participation of the receiver host in all the multicast groups; and

15 in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in all the multicast groups.

8. The multicast authentication method according to claim 1, wherein

20 in the registration step, accepted time for accepting the each receiver host to participate in the one multicast group is further registered in the authentication server; and

25 in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in the one multicast group within the accepted time.

9. The multicast authentication method according to claim 8, wherein

in the acceptance step, the accepted time is preset for each of the multicast groups, the accepted time is set for each of the receiver hosts based on participation time for participating in the one multicast group designated by the each receiver host and the accepted time thus set is registered in the authentication server when the participation application is made.

10. The multicast authentication method according to claim 8, wherein

in the acceptance step, the accepted time is preset for each of the multicast groups, and the accepted time is registered in the authentication server based on the one multicast group designated by the each receiver host when the participation application is made.

11. The multicast authentication method according to claim 8, wherein

the authentication step is executed by the authentication server, and if the each receiver host is registered as a user together with an authentication result, information on the accepted time serving as the registration content is transmitted to said network interconnection apparatus; and the acceptance step is executed by said network interconnection apparatus, said network interconnection

apparatus determines that the participation is accepted based on the authentication result received and accepts the participation of the each receiver host in the multicast group within the accepted time received.

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12. The multicast authentication method according to claim 8, wherein

the authentication step and the acceptance step are executed by said network interconnection apparatus, and the authentication server transmits a user registration content for the designated transmitting end address and the designated one multicast group to said network interconnection apparatus when the participation application is made; and

the network interconnection apparatus determines whether the each receiver host is authenticated based on the registration content, determines whether the participation of the each receiver host is accepted based on the authentication result and accepts the each receiver host to participate in the multicast address group within the accepted time.

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13. The multicast authentication method according to claim 8, wherein

in the authentication step, before the accepted time, it is determined the authentication as a failure.

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host.

17. The multicast authentication method according to claim 16, further comprising an acceptance step of accepting each of the receiver hosts to participate in the one multicast group of the receiver host if the receiver host is authenticated in response to the participation request message.

18. The multicast authentication method according to claim 17, wherein
in the acceptance step, if a multicast user registration is made in the registration step and it is determined in the authentication step that authentication fails, an entry of the multicast user registration is deleted in the acceptance step.

19. The multicast authentication method according to claim 16, wherein
in the registration step, information on a port of said network interconnection apparatus to which the each receiver host or the relay unit is connected is registered together with an address of the each receiver host or the address of the relay unit in the authentication server.

20. The multicast authentication method according to claim 16, wherein
in the registration step, a group address of the multicast

group is further registered in the authentication server; and

in the authentication step, the each receiver host or the relay unit and the one multicast group are authenticated based on the registration content of the authentication server

5 in response to the participation request message from the each receiver host.

21. The multicast authentication method according to claim 20, wherein

10 in the registration step, a pair of the address of the each receiver host or the relay unit and the group address of the one multicast group are registered as one user name; and

in the authentication step, a transmitting end address and the group address included in the participation request message are extracted, and the registration content of the authentication server is retrieved and the each receiver host or the relay unit is authenticated while setting a pair of the transmitting end address and the group address as one user
15
20 name.

22. The multicast authentication method according to claim 16, wherein

in the registration step, an address of the each receiver
25 host or the address of the relay unit is registered in the authentication server in response to an application for participation of the receiver host in all the multicast groups;

and

in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in all the multicast groups.

23. The multicast authentication method according to claim 16, wherein

in the registration step, accepted time for accepting the each receiver host to participate in the one multicast group is further registered in the authentication server; and

in the acceptance step, if the each receiver host is authenticated in response to the participation request message, the receiver host is accepted to participate in the one multicast group within the accepted time.

24. The multicast authentication method according to claim 23, wherein

in the acceptance step, the accepted time is preset for each of the multicast groups, the accepted time is set for each of the receiver hosts based on participation time for participating in the one multicast group designated by the each receiver host and the accepted time thus set is registered in the authentication server when the participation application is made.

25. The multicast authentication method according to claim 23, wherein

in the acceptance step, the accepted time is preset for each of the multicast groups, and the accepted time is registered in the authentication server based on the one multicast group designated by the each receiver host when the participation application is made.

26. The multicast authentication method according to claim 23, wherein

the authentication step is executed by the authentication server, and if the each receiver host is registered as a user together with an authentication result, information on the accepted time serving as the registration content is transmitted to said network interconnection apparatus; and

the acceptance step is executed by said network interconnection apparatus, said network interconnection apparatus determines that the participation is accepted based on the authentication result received and accepts the participation of the each receiver host in the multicast group within the accepted time received.

27. The multicast authentication method according to claim 23, wherein

the authentication step and the acceptance step are executed by said network interconnection apparatus, and the authentication server transmits a user registration content

for the designated transmitting end address and the designated
one multicast group to said network interconnection apparatus
when the participation application is made; and

the network interconnection apparatus determines
5 whether the each receiver host is authenticated based on the
registration content, determines whether the participation
of the each receiver host is accepted based on the authentication
result and accepts the each receiver host to participate in
the multicast address group within the accepted time.

10 28. The multicast authentication method according to claim
23, wherein

in the authentication step, before the accepted time,
it is determined the authentication as a failure.

15 29. The multicast authentication method according to claim
16, wherein

in the multicast authentication method, the sender host
is the Internet service provider, the service provider
20 providing a content stream delivery service by a delivery
server; and in the acceptance step, a content stream delivered
from the delivery server within the accepted time is
multicast-forwarded to the accepted receiver host.

25 30. The multicast authentication method according to claim
16, further comprising an accounting step of charging for an
executed service.

31. An authentication server provided in a network of a sender host, comprising a registration unit which registers an address of a receiver host connected to a network of a sender host in accordance with a participation application for participating in a multicast group of the sender host from the receiver host.

32. The authentication server according to claim 31, further comprising:

an authentication unit which determines whether the participation is authenticated based on a registration content of the registration unit in response to a participation request message from the receiver host; and

a transmission unit which transmits an authentication result of the authentication unit.

33. The authentication server according to claim 32, wherein the transmission unit transmits the registration content of the registration unit in response to the participation request message from the receiver host.

34. The authentication server according to claim 31, wherein the registration unit registers, together with the address of the receiver host or an address of the relay unit, information on a predetermined port to which the receiver host or the relay unit is connected.

35. The authentication server according to claim 31, wherein
the registration unit registers, together with the
address of the receiver host or an address of the relay unit,
a group address of the multicast group for which the
5 participation application is made.

36. The authentication server according to claim 35, wherein
the registration unit registers a pair of the address
of the receiver host or the address of the relay unit and the
10 group address of the multicast group as one user name; and
the authentication unit retrieves the registration content
of the registration unit and determines whether the receiver
host or the relay unit is authenticated while setting a pair
of a transmitting end address included in the participation
15 request message and the group address as one user name.

37. The authentication server according to claim 31, wherein
the registration unit further registers accepted time
for accepting the receiver host to participate in the multicast
20 group.

38. The authentication server according to claim 31, further
comprising a control unit which allows the accepted time to
be registered in the registration unit based on participation
25 time for participating in the multicast group designated by
the receiver host when the participation application is made.

39. The authentication server according to claim 31, further comprising a control unit which allows the accepted time to be registered in the registration unit based on the multicast group designated by the receiver host when the participation application is made.

40. An authentication server provided in a network of a sender host, comprising a registration unit which registers an address of a receiver host connected to a network of a sender host through a relay unit in accordance with a participation application for participating in a multicast group of the sender host from the receiver host.

41. The authentication server according to claim 40, further comprising:

an authentication unit which determines whether the participation is authenticated based on a registration content of the registration unit in response to a participation request message from the receiver host; and

a transmission unit which transmits an authentication result of the authentication unit.

42. The authentication server according to claim 41, wherein the transmission unit transmits the registration content of the registration unit in response to the participation request message from the receiver host.

43. The authentication server according to claim 40, wherein
the registration unit registers, together with an address
of the receiver host or the address of the relay unit, information
on a predetermined port to which the receiver host or the relay
unit is connected.

44. The authentication server according to claim 40, wherein
the registration unit registers, together with an address
of the receiver host or the address of the relay unit, a group
10 address of the multicast group for which the participation
application is made.

45. The authentication server according to claim 44, wherein
the registration unit registers a pair of the address
15 of the receiver host or the address of the relay unit and the
group address of the multicast group as one user name; and
the authentication unit retrieves the registration content
of the registration unit and determines whether the receiver
host or the relay unit is authenticated while setting a pair
20 of a transmitting end address included in the participation
request message and the group address as one user name.

46. The authentication server according to claim 40, wherein
the registration unit further registers accepted time
25 for accepting the receiver host to participate in the multicast
group.

47. The authentication server according to claim 40, further comprising a control unit which allows the accepted time to be registered in the registration unit based on participation time for participating in the multicast group designated by the receiver host when the participation application is made.

48. The authentication server according to claim 40, further comprising a control unit which allows the accepted time to be registered in the registration unit based on the multicast group designated by the receiver host when the participation application is made.

49. A network interconnection apparatus connected to a plurality of receiver hosts and connected to an authentication server through a network of a sender host, comprising:

a transmission processing unit which extracts a transmitting end address of a participation request message received from each of the receiver hosts, creates a message inquiring about authentication information, and conducts a transmission processing for transmitting the created message to the authentication server; and

an acceptance unit which accepts participation of the each receiver host in the multicast group based on an authentication result message received from the authentication server.

50. The network interconnection apparatus according to claim 49, wherein

said network interconnection apparatus further comprises a management table for managing receivers of the multicast group; and

the transmission processing unit determines whether an entry of the extracted transmitting end address exists in the management table, and for transmitting the message inquiring about the authentication information based on a determination result.

51. The network interconnection apparatus according to claim 50, wherein

the acceptance unit deletes the corresponding entry registered in the management table if the authentication result of the authentication server shows that authentication fails.

52. The network interconnection apparatus according to claim 49, wherein

the transmission processing unit extracts a group address as well as the transmitting end address of the received participation request message, creates the message inquiring about the authentication information, and conducts the transmission processing for transmitting the created message to the authentication server.

53. The network interconnection apparatus according to claim
49, wherein

the acceptance unit accepts participation of the each
receiver host in the multicast group within accepted time based
5 on the authentication result message received from the
authentication server.

54. The network interconnection apparatus according to claim
53, wherein

10 the acceptance unit deletes the corresponding entry
registered in the management table if the authentication result
of the authentication server shows that authentication fails.

55. The network interconnection apparatus according to claim
15 54, wherein

the sender host is the Internet service provider, the
service provider comprising a delivery server delivering a
content stream, the delivery server provided in the network;
and the acceptance unit of said network interconnection
20 apparatus multicast-forwards a packet of the content stream
delivered from the delivery server to the accepted each receiver
host within the accepted time.

56. The network interconnection apparatus according to claim
25 49, wherein

the sender host is the Internet service provider, the
service provider comprising a delivery server delivering a

content stream, the delivery server provided in the network;
and the acceptance unit of said network interconnection
apparatus multicast-forwards a packet of the content stream
delivered from the delivery server to the accepted each receiver
5 host.

57. The network interconnection apparatus according to claim
56, wherein

the sender host is the Internet service provider, the
10 service provider comprising the delivery server delivering
the content stream, the delivery server provided in the network;
and the acceptance unit of said network interconnection
apparatus multicast-forwards the packet of the content stream
delivered from the delivery server to the accepted each receiver
15 host within the accepted time.

58. A multicast authentication system comprising: a
plurality of receiver hosts; a network of a sender host; a
network interconnection apparatus for connecting the plurality
20 of receiver hosts to the network; and an authentication server
provided in the network, wherein

the authentication server, provided in the network of
the sender host, comprises a registration unit which registers
an address of one of the receiver hosts connected to the network
25 of the sender host in accordance with a participation
application for participating in a multicast group of the sender
host from the receiver host;

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said network interconnection apparatus, connected to
the plurality of receiver hosts and connected to the
authentication server through the network of the sender host,
comprises a transmission processing unit which extracts a
5 transmitting end address of a participation request message
received from the one receiver host, creates a message inquiring
about authentication information, and conducts a transmission
processing for transmitting the created message to the
authentication server; and an acceptance unit which accepts
10 participation of the one receiver host in the multicast group
based on an authentication result message received from the
authentication server; and

the authentication server authenticates the
participation of the one receiver host in the multicast group
15 of the sender host, and said network interconnection apparatus
accepts the receiver host to participate in the multicast group.

59. The multicast authentication system according to claim
58, further comprising:

20 a relay unit connected between the network
interconnection apparatus and the plurality of receiver hosts,
the relay unit changing the transmitting end address of the
participation request message transmitted from the one receiver
host to an address of the relay unit itself and relaying the
25 changed address to said network interconnection apparatus,
the relay unit changing a destination address a packet
transmitted from said network interconnection apparatus, the

destination address being the address of the relay unit itself,
to the address of the one receiver host issuing the participation
request and relaying the changed address to the one receiver
host.

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60. The multicast authentication system according to claim
58, wherein the multicast authentication system further
comprises a delivery server provided in the network and
delivering a content stream, and multicast-forwards a packet
10 of the content stream delivered from the delivery server to
the accepted one receiver host.

61. The multicast authentication system according to claim
60, wherein the multicast authentication system
15 multicast-forwards the packet of the content stream delivered
from the delivery server to the accepted one receiver host
within accepted time.

62. The multicast authentication system according to claim
20 58, wherein

the multicast authentication system further comprises an accounting server provided in the network and charging for an executed service; and

said network interconnection apparatus detects a
25 multicast stream, and transmits detection data to said
accounting server.